CLAIMS

1. A voltage summer including a transformer having a primary side and a secondary side, wherein a first voltage to be summed is connected to the primary side and a second voltage to be summed is connected to the secondary side.

2. A voltage summer according to claim 1, wherein the first voltage is connected between the first tap of the primary side and the second tap of the primary side, and the second voltage is connected to a first tap of the secondary side, a summed voltage being provided on a second tap of the primary or secondary side.

3. A voltage summer according to claim 2, wherein the first voltage is greater than the second voltage and the summed voltage is provided on the second tap of the primary side of the transformer.

4. A voltage summer according to any one of claims 1 to 3 wherein the first voltage is a variable voltage.

5. A voltage summer according to claim 4 wherein the first voltage is provided by a switchable voltage source.

6. A voltage summer according to any one of claims 1 to 5 wherein the second voltage is variable.

7. A voltage summer according to claim 6 wherein the second voltage is provided by a switchable voltage source.

8. A voltage summer according to claim 6 or claim 7 when dependent upon claim 4 or claim 5 wherein the first voltage is variable between n levels and the second voltage is variable between m levels, wherein the summed voltage is variable between n*m levels.

9. A voltage summer according to claim 6 wherein the second voltage is provided by a continuously variable voltage source.

10. A voltage summer according to claim 6 wherein the second voltage is provided by a fixed voltage source.

11. A voltage source according to any one of claims 1 to 10 wherein the first voltage signal is a coarse voltage signal and the second voltage signal is a fine voltage signal.

12. A voltage source according to claim 11 wherein the fine voltage signal is representative of an error in the course voltage signal.

13. A voltage summer according to claim 12, further including a reference voltage source, and a difference means for removing the reference voltage from the summed voltage to generate the second voltage.

14. A voltage summer according to claim 12, further including a reference current source, a means for sensing the current in the primary side of the transformer, a difference means for removing the reference current from the sensed current to generate a difference current, and a driver for supplying the second voltage in dependence on the difference current.

15. A power supply including a voltage summer according to any one of claims 1 to 14.

16. A method of summing voltages including applying a first voltage to a primary side of a transformer and applying a second voltage to a secondary side of the transformer, wherein a sum of the first and second voltages is provided on one of the first or second sides of the transformer.

17. A method according to claim 16, wherein the first voltage is applied between the first tap of the primary side and the second tap of the primary side, and the second voltage is applied to a first tap of the secondary side, wherein a summed voltage is provided on a second tap of the primary or secondary side.

18. A method according to claim 17, wherein the first voltage is greater than the second voltage and the summed voltage is provided on the second tap of the primary side of the transformer.

19. A method according to any one of claims 16 to 18 further comprising the step of varying the first voltage.

20. A method according to any one of claims 16 to 19 further comprising the step of varying the second voltage.

21. A method according to claims 19 or 20 comprising varying the first voltage between n levels and varying the second voltage between m levels, wherein the summed voltage is thereby variable between n*m levels.

22. A method according to any one of claims 16 to 21 wherein the first voltage signal is a coarse voltage signal and the second voltage signal is a fine voltage signal.

23. A method according to claim 22 wherein the fine voltage signal is representative of an error in the course voltage signal.

24. A method according to any one of claims 16 to 23, further including the step of generating a reference voltage, and removing the reference voltage from the summed voltage to thereby generate the second voltage.

25. A method according to any one of claims 16 to 23, further including the step of generating a reference current, sensing the current in the primary side of the transformer, removing the reference current from the sensed current to generate a difference current, and supplying the second voltage in dependence on the difference current.

26. A transformer comprising a primary winding and a secondary winding and having a turns ratio of primary winding to secondary winding of x:y, the transformer including:

   a. x turns in series in the primary winding and y turns in series in the secondary winding;

   b. an equal number of turns in the primary and secondary windings; and

   c. each primary winding turn closely coupled with a secondary winding turn.

27. A transformer according to claim 26 wherein the closely coupled turns are coupled in parallel.

28. A transformer according to claim 26 or 27, wherein the number of turns in the primary and secondary winding is x*y.

29. A transformer according to claim 28 wherein there is provided y parallel branches in the primary winding, each with x turns.

30. A transformer according to claim 28 or claim 29, wherein there is provided x parallel branches in the secondary winding, each with y turns.

31. A transformer according to any one of claims 28 to 30, wherein there is provided p branches in the primary winding, the number of turns in the primary winding being p*x*y.

32. A transformer according to claim 31 wherein there is provided p*x branches in the secondary winding.

33. A transformer according to any one of claims 27 to 32 wherein there is an equal number of turns in each parallel branch.

34. A transformer according to any one of claims 31 to 33 wherein the number of branches in the primary winding is y*p, the number of branches in the secondary winding being x*p.

35. A transformer according to any one of claims 26 to 34 in which there is provided a plurality of primary windings i each having a turns ratio of primary winding to secondary winding of x_i:y, wherein each turn of each primary winding is closely coupled with a turn of each other primary winding.

36. A transformer according to claim 35 when dependent upon any one of claims 28 to 34 in which the umber of terms in the primary and secondary winding is the lowest common multiple of x_i*y for all i.

37. A transformer according to claim 36 in which the lowest common multiple is t, the number of branches in each primary winding being t/x_i, each having x_i turns.

38. A transformer according to claim 37 in which the number of branches in the secondary winding is t/y, each having y turns.

39. A transformer according to any one of claims 35 to 38 when dependent on any one of claims 31 to 34, wherein there is provide p_i branches in each primary winding, the number of turns in each primary winding being p_i*x_i*y.

40. A transformer comprising a plurality i of primary windings and a secondary winding and having a turns ratio of primary winding to secondary winding of x_i:y, the transformer including:

   a. x_i turns in series in each primary winding i and y turns in series in the secondary winding;

   b. an equal number of turns in each primary and secondary windings; and

   c. each primary winding turn being closely coupled a turn of every other primary winding and with a secondary winding turn.